

CSC 447 - Artificial Neural Networks

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1 Training results

How well does your network train?

The following results were run on a neural network topology of 25 input nodes, 3 or 4 hidden nodes (dependent on which parameter file was used) and 3 output nodes.

Our network appears to train really well. With 1-2 training sessions, the RMS values are often below 0.12 for both the Black Hills data and the Northwest South Dakota data.

After training the network with the Black Hills data, if the same Black Hills data is run as a test, the accuracy we got was between 94% and 100%. However, when the Northwest data was run on a Black Hills trained net, the accuracy was lower. We

```
1900212@linux13 WildFireNeuron >>./ANNtest bh.prm
Year: 1980      Expected: 010   Predicted: 010
Year: 1981      Expected: 100   Predicted: 100
Year: 1982      Expected: 100   Predicted: 100
Year: 1983      Expected: 010   Predicted: 000*
Year: 1984      Expected: 100   Predicted: 100
Year: 1985      Expected: 001   Predicted: 001
Year: 1986      Expected: 100   Predicted: 100
Year: 1987      Expected: 100   Predicted: 100
Year: 1988      Expected: 001   Predicted: 001
Year: 1989      Expected: 100   Predicted: 100
Year: 1990      Expected: 001   Predicted: 001
Year: 1991      Expected: 010   Predicted: 010
Year: 1992      Expected: 100   Predicted: 100
Year: 1993      Expected: 100   Predicted: 100
Year: 1994      Expected: 100   Predicted: 100
Year: 1995      Expected: 100   Predicted: 100
Year: 1996      Expected: 100   Predicted: 100
Year: 1997      Expected: 010   Predicted: 000*
Year: 1998      Expected: 100   Predicted: 100
Year: 1999      Expected: 100   Predicted: 100
Year: 2000      Expected: 001   Predicted: 001
Year: 2001      Expected: 001   Predicted: 001
Year: 2002      Expected: 001   Predicted: 001
Year: 2003      Expected: 001   Predicted: 001
Year: 2004      Expected: 100   Predicted: 100
Year: 2005      Expected: 010   Predicted: 010
Year: 2006      Expected: 100   Predicted: 100
Year: 2007      Expected: 001   Predicted: 001
Year: 2008      Expected: 100   Predicted: 100
Year: 2009      Expected: 100   Predicted: 100
Year: 2010      Expected: 100   Predicted: 100
Year: 2011      Expected: 001   Predicted: 001
Year: 2012      Expected: 001   Predicted: 001
Year: 2013      Expected: 100   Predicted: 100
Year: 2014      Expected: 100   Predicted: 100
Year: 2015      Expected: 100   Predicted: 100
Accuracy is: 94.44%
```

2 Network Topology

What is the impact of network topology (i.e., changing the number of hidden layer nodes) on training?

3 Generalization of Data

How well does the network generalize from training data to testing data?